**GRADE 8** – **ANSWERS** for the end of chapter review questions.

**Ch. 1 – pp. 32 - 33**

1. Dependent variable
2. Hypothesis
3. Technology
4. Control
5. Scientific methods
6. Constant
7. Independent variable
8. A
9. C
10. D
11. D
12. D
13. A
14. A
15. C
16. C
17. D
18. You won’t forget and have incomplete or inaccurate data
19. Analyzing data is reviewing and organizing it in an orderly way so you can understand it. You then use this information as a basis for your conclusions about whether the hypothesis is supported.
20. Experimental results are more reliable when bias is eliminated.
21. Listing what they already know gives scientists a starting point for their investigations. They won’t waste time learning something that has already been discovered. They will learn what does not work.
22. It would be in doubt; you wouldn’t know whether one variable had caused the reaction or whether it was caused by a combination of variables.
23. One might conclude that Antibiotic A was successful in killing the bacteria while Antibiotic B appeared to have no effect on the bacteria’s growth. More trials are needed to support these results.

**Ch. 1 – pg. 34**

1. C
2. D
3. D
4. B
5. B
6. A
7. D
8. A
9. Recognize the problem. Then formulate a hypothesis. Next test this hypothesis. Then analyze your data and draw a conclusion.
10. This allows them to understand each other’s research and compare results.
11. As a way to organize your data and help analyze it. It helps you draw conclusions and is easily understood by others.
12. You have to repeat the exact experiment to prove your results are valid.
13. New discoveries lead to new products. These products may then improve your lifestyle or standard of living.
14. A control is a sample that is treated like the other experimental groups except the independent variable is not applied to it. The control is often used to show what happens when you do nothing.
15. If you share your results, you give others the chance to share new ideas about your experiment that might improve your research.
16. Computers can be used to store and display information, communicate with fellow scientists, analyze data, review current research, and write reports for publication.
17. You use your senses to make observations. These can be inaccurate and misleading. It may be difficult to convey your observations to others.

**Ch. 14 – pp. 428-429**

1. Neutron
2. Element
3. Mass number
4. Electron
5. Radioactive decay
6. Atomic number
7. D
8. D
9. D
10. B
11. C
12. C
13. D
14. B
15. They may have different numbers of neutrons.
16. Yes; yes; atoms can transmutate.
17. The amount of charge on one proton is the same as the amount of charge on one electron. To have no charge, the number of protons must equal the number of electrons.
18. Dalton’s model stated that matter is made up of atoms that cannot be divided into smaller pieces. The modern model places neutrons and protons in a tiny central nucleus with the electrons in a cloud around the nucleus.
19. The half-life of Carbon 14 is known. In living organisms the amount of C-14 is constant, but when an organism dies, no new C-14 enters the organism. Scientists measure the C-14 in the organism and calculate how it differs fro the amount that would be there if the organism were alive. From the difference they determine the age of the organism.
20. Omit
21. Omit
22. Mercury has 80 protons, so this atom has 121 neutrons.
23. Omit

**Ch15 – pp. 458-459**

1. A group is a column on the periodic table, and a period is a row on the periodic table.
2. Metalloids are elements that share properties with both metals and nonmetals. Semiconductors are materials that conduct electricity better than nonmetals but not as well as metals. Some semiconductors are metalloids.
3. A catalyst is a substance that can make something happen faster but is not changed itself.
4. The terms nonmetal, metalloids, and metal are in order of increasing ability to conduct heat and electricity.
5. Both conduct electricity, but a metal conducts better. A metalloid has some other properties of metals.
6. Synthetic elements are elements that don’t occur in nature but that have been made by scientists.
7. In general, transition elements are metals that are malleable, ductile, and lustrous; conduct heat and electricity; and have high boiling points.
8. Some gases are considered to be noble because they do not combine readily with other elements.
9. C
10. B
11. B
12. B
13. D
14. A
15. A
16. C
17. D
18. Mercury is poisonous and can kill organisms that live in waterways.
19. Yes, fluorine is the most reactive nonmetal.
20. The relative size increases down a group and decreases moving left to right across a period.
21. They would be shorter
22. Selenium is light-sensitive. Too much light might interfere with imaging.
23. [ answer should indicate that oxygen has the ability to react with other elements while nitrogen won’t.]
24. Na, Mg, F, and Cl are all representative elements. Na and Mg are sold metals while F and Cl are gaseous nonmetals. F and Cl have more similar properties to each other than Na and Mg, because they are in the same group.

Ch. 16 – pp. 486-487

1. An ion is a charged atom, whereas a molecule is two or more atoms covalently bonded with each other.
2. A molecule contains atoms joined by covalent bonds whereas a compound contains two or more elements, whether joined by covalent or ionic bonds.
3. An electron dot diagram indicates the number of electrons in an atom’s outer energy level. If one or more of those electrons are lost or gained, an ion is formed.
4. A molecule is composed of covalently bonded atoms. Its composition may be expressed by a chemical formula.
5. An ionic bond forms when positively and negatively charged ions are attracted to each other. A covalent bond occurs when two or more atoms share electrons.
6. An electron cloud shows the areas probably occupied by electrons moving around a nucleus. An electron dot diagram indicates the number of electrons in the outer energy level of an atom.
7. A polar bond is a type of covalent bond in which electrons are shared *unequally*.
8. A compound is a pure substance made up of two or more elements. Its formula shows what those elements are and in what proportion they occur.
9. Metallic bonds form between metal atoms when they pool electrons. Ionic bonds form between ions that are attracted by opposing charges.
10. A
11. D
12. A
13. C
14. D
15. B
16. B
17. B
18. D
19. Elements in groups 1 and 2 lose one or two electrons easily. Elements in groups 16 and 17 gain one or two electrons easily.
20. A covalent bond; the picture shows a pair of electrons that is shared between the hydrogen and the fluorine.
21. The electrons are shared unequally. The electrons spend more time near the fluorine atom than the hydrogen atom.
22. The positive ends of a polar water molecule are attracted to the chloride ions and pull them out of the solid. The negative ends of the polar water molecules are attracted to the sodium ions and pull them out of the solid.
23. The outer electron in cesium is farther from the nucleus and is therefore more easily removed from the atom making cesium more reactive.
24. The negative parts of water molecules are attracted to the positive parts of other water molecules. Because of theses attractions, more energy is required to separate the molecules.
25. CuCl will yield more copper because it contains a higher proportion of copper than does CuCl2.
26. Omit
27. The lowest energy level can contain only two electrons. Since this energy level is helium’s outer level, it is full with two electrons.
28. Metallic bonds.

**Ch. 17 – pp. 514-515**

1. Omit
2. Omit
3. The reactants are the materials present at the beginning of a chemical reaction and the products are the materials that are present when the reaction is over.
4. Omit
5. Omit
6. A chemical equation shows all the substances that react and are produced by as chemical reaction. A reactant is a substance that exists before a chemical reaction.
7. Omit
8. Omit
9. Omit
10. C
11. Omit (C)
12. D
13. Omit (C)
14. A
15. Omit (A)
16. D
17. B
18. B
19. Omit (B)
20. The pickling compounds inhibit spoilage of the pickles.
21. No; a chemical reaction did not occur because there is no change in the identity of the water.
22. No; both representations show one sulfur atom and two silver atoms, but in the second one, the atoms are combined in the compound silver sulfide. In the first one, they are individual atoms.
23. Omit
24. You would use ground meat. It has a greater surface area and would cook faster.
25. (a) A is the reactant – (b) B is the product – (c) the first minute.
26. The iron in the steel wool has reacted with oxygen and water vapor in the air, therefore, the mass should increase.

**Ch. 17 - Pg. 516**

1. B
2. A
3. Omit (C)
4. B
5. C
6. A
7. Omit (C)
8. A change in volume is a physical change because the chemical makeup of the material is the same before and after the change.
9. The precipitate is silver chloride, AgCl
10. The speed of the molecules would decease, but the molecules would never stop moving entirely.
11. The speed of most chemical reactions increases when temperature increases. The faster movement of atoms and molecules at higher temperatures means the particles are more likely to collide with each other.
12. Yes; even though the reactions release energy later, they need a minimum amount of energy to start.